VOL. 10, No. 6 JUNE 1956

CHRONICLE OF THE WORLD HEALTH ORGANIZATION

CONTENTS

	Page
Field trial of typhoid vaccines	153
Water pollution in Europe	156
Malaria eradication: a progress report	161
Epidemiological and Statistical Information	
Cirrhosis of the liver and alcoholism	166
Mortality from suicide	170
Reports of Expert Groups	
Food hygiene	172
Recent advances in the diagnosis and treatment of trachoma	175
The training of auxiliary health workers	177
Notes and News	
Study group on paediatric education	179
Inter-regional malaria conference	179
Expert Committee on Malaria: sixth session	180
Expert Committee on Insecticides: seventh session	180
Expert Committee on Organization of Medical Care	181
European conference on post-basic nursing education	181
Study group on toxic hazards of pesticides to man	182
Advisory group on accident prevention	183
Seminar on vital and health statistics	183
Study group on water standards	184
Seminar on teaching of preventive medicine	184
Malaria consultant for Eastern Mediterranean countries	185
BCG vaccination in Jordan	185
Contribution to special malaria eradication account	185
New appointments	185
Review of WHO Publications	186

SCHEDULE OF MEETINGS

4-8 June	**Advisory Group on Prevention of Accidents in Childhood, Geneva**
5-14 June	**PASB/AMRO Executive Committee, twenty-eighth session, Washington, D.C.**
6-13 June	**Study Group on the Toxic Hazards of Pesticides to Man, Geneva**
11-16 June	**Study Group on International Standards of Drinking Water, Geneva**
11-19 June	**Inter-Regional Conference on Malaria for the Eastern Mediterranean and European Regions, Athens**
12-26 June	**European Conference on Post-Basic Nursing Education, Peebles, Scotland**
18-23 June	**Expert Committee on Organization of Medical Care, Geneva**
21-29 June	**Expert Committee on Malaria, sixth session, Athens**
2-7 July	**Conference on the Teaching of Preventive Medicine, Zagreb**
10-17 July	**Expert Committee on Insecticides, seventh session, Geneva**
23-29 July	**Fifth European Seminar for Sanitary Engineers, Helsinki**
30 July-4 August	**Study Group on Paediatric Education, Stockholm**

The mention of manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature which are not mentioned. Proprietary names of such products are distinguished by initial capital letters.

PRINTED IN SWITZERLAND

FIELD TRIAL OF TYPHOID VACCINES[1]

All vaccines and other biological materials produced for large-scale public health application must be subjected to laboratory tests to ensure their potency, since biological potency cannot be guaranteed simply by following a formula. Potency in this context means potency in man, but for obvious reasons it must normally be measured by an effect in an animal. Many diseases occur naturally only in human beings, and the response of animals both to the protective stimulus of a vaccine and to a subsequent challenge by virulent organisms may be quite different from that of man. It follows, therefore, that if a laboratory potency test is to have a practical value it must be shown to give results which can be correlated with the actual protection afforded to man. The importance of this requirement was not sufficiently recognized in the past, and it is only in the last two decades that the errors involved in applying the results obtained in experimental animals directly to man have to some extent been appreciated, although still not widely enough. As a result, some prophylactics in routine use for many years have never had their real protective value measured in man, and therefore the value of laboratory tests on these vaccines can be estimated only on the basis of arbitrary assumptions. A good example of this is typhoid vaccine.

Typhoid vaccines have been in use since the beginning of this century, and yet no strictly controlled trial in man acceptable by modern standards has ever been made. The earliest field trials, which were carried out by Wright and his colleagues in the British Army between 1904 and 1908, are open to criticism on the grounds that the vaccinated and unvaccinated groups were not comparable and that the differences observed in the incidence of typhoid might have been due to factors other than vaccination. Yet for many years these field trials were regarded as giving convincing proof of the effectiveness of typhoid vaccine.

During the First World War, typhoid vaccines were extensively used in many armies, and little doubt was left in the minds of observers that vaccination had a considerable effect in reducing the incidence of typhoid fever; but no real estimate of the effectiveness of vaccines could be made on the basis of the figures available.

During the Second World War, experience varied considerably: some vaccines were apparently highly effective, whereas others appeared to be less so; and a vaccine which according to some reports belonged to the former category was observed to break down from time to time and to give little or no protection. It gradually became clear from the accumulated observations that it was impossible to give any realistic figure as to the effectiveness of typhoid vaccines or to say which method of preparation was the best or which laboratory tests of potency bore a relationship to the effectiveness of the vaccine in man.

The tremendous surge of interest in public health problems in a world recovering from the ravages of the Second World War served to emphasize the enormous difficulties facing many countries in their attempts to control communicable diseases. One main difficulty was the great capital expenditure required

[1] Much of the information contained in this article was derived from unpublished reports of the Typhoid Commission of Yugoslavia.

to raise the standard of environmental hygiene and sanitation in order to control enteric diseases. Since it was inevitable that such expenditure would have to be spread over many years, countries in which typhoid fever remained a serious public health problem turned to vaccination as the principal method of control.

When the Government of Yugoslavia decided on this solution, it appreciated the urgent need for more reliable information as to what vaccine should be used, how its potency should be tested, and what results might be expected. Accordingly, the Government asked the World Health Organization for advice and guidance as to how this information might be obtained. The result of these consultations was a decision to carry out the first strictly controlled field trial of typhoid vaccines, some 50 years after their initial use.

The Yugoslav Government set up a Typhoid Commission to conduct the trial under the guidance of experts provided by WHO. The heavy burden of financing the work was borne to a very large extent by the Yugoslav Government, though grants were received from the World Health Organization and the United States Public Health Service.[2]

After a survey of the incidence of typhoid fever in various parts of Yugoslavia, the town of Osijek and its surroundings were selected as the place of the trial, since for several years past there had been a consistently high incidence of typhoid fever in this area, and since it was a part of the country which possessed excellent epidemiological, hospital, and laboratory staff and facilities.

The field trial was designed by the Typhoid Commission in consultation with the WHO experts. It had three principal aims : (*a*) to determine whether the two typhoid vaccines selected for the test actually gave protection against typhoid fever ; (*b*) to establish the superiority of one or the other ; and (*c*) to decide whether or not the protection afforded to man could be related to the results of existing laboratory tests. The two vaccines selected were, first, an alcohol-killed and alcohol-preserved vaccine prepared according to the method of Felix, and, second, a heat-killed phenol-preserved vaccine. These vaccines were produced at the Institute of Hygiene at Zagreb from pooled cultures of the same strains of *Salmonella typhi* (Ty 2). (The strains were supplied by A. Felix.) The control vaccine was prepared from locally isolated strains of Flexner dysentery bacilli and was preserved part in alcohol and part in phenol, so that field workers would be unable to distinguish it from the two test vaccines.

The field work was organized under the direction of Dr B. Cvjetanović,[3] Secretary of the Typhoid Commission. Extensive preparatory measures were undertaken, including a pilot trial in an island off the Adriatic Coast, widespread propaganda and health education in Osijek and the surrounding district, and a thorough preparatory course of instruction for the doctors, health visitors, and other workers who were to carry out the actual field work. So successful were these preliminary measures that approximately 36 000 individuals between the ages of 5 and 50 voluntarily took part in the trial, although many were fully aware that one of the vaccines used would give no protection against typhoid fever.

Vaccination began in the month of April 1954, two doses being given at three weeks' interval. The vaccine administered to each individual was chosen in an entirely random fashion, and the field worker did not know which vaccine he had selected, since its

[2] The total cost amounted to approximately $133 500. Of this sum, the Government and other institutions in Yugoslavia contributed approximately 33 million dinars ($110 000). The grants received from WHO and the US Public Health Service were $6500 and $17 000, respectively.

[3] School of Public Health, Zagreb

identity was concealed by means of code letters to avoid any possibility of bias. A careful follow-up was instituted with the co-operation of medical practitioners, nurses, school-teachers, and others. This included regular visits to the homes of the persons vaccinated, during which the opportunity was taken to make additional epidemiological inquiries. Some of the subjects were visited one, two, and three days after each inoculation to assess the severity of reactions. Furthermore, blood samples were taken at random from the three groups at various periods after vaccination in order to study the serological changes produced. At the end of the first year of the study, all those in the test groups received booster doses of the appropriate vaccine. An additional number of volunteers were vaccinated for the first time, and all groups were followed up for a further year, that is, until the end of April 1956.

In the meantime the vaccines used were subjected to extensive laboratory tests at the Institute of Hygiene, Zagreb, the Lister Institute of Preventive Medicine in London, and the Walter Reed Army Medical Center in Washington. A batch of several litres of each vaccine was set aside for study under the auspices of the WHO Expert Committee on Biological Standardization, with a view to the possibility of establishing one or the other of the vaccines as an international standard, if this were justified by the field and laboratory results. The advantages of having as an international standard a vaccine that has had its potency actually measured in the field needs no emphasis. These studies are still in progress.

The field trial proper has now been completed, but the results are still being analysed. It would therefore be unwise at this time to give precise figures or to draw final conclusions. However, preliminary analysis has shown that the three groups—alcohol, phenol, and control—were comparable in every respect, the only significant difference between them being the vaccine administered and the incidence of typhoid fever. The diagnosis of typhoid fever in the cases upon which the following remarks are based was made on the finding of a positive blood culture in association with clinical illness. Only such cases were accepted as proven. During the first year, that is to say, in the period of primary vaccination, it was evident that the phenol vaccine was giving significant protection. This was especially marked in children under the age of 15, although the vaccine also appeared to give some protection to adults. When all age groups were considered together, it was not evident that the alcohol vaccine gave significant protection, but in the case of persons over the age of 15 the degree of protection appeared to be equivalent to that afforded by the phenol vaccine. The figures were, however, rather small. During the second year, that is to say, after the administration of a booster dose, both vaccines appeared to give highly significant protection and appeared to be almost equally effective.

As a provisional conclusion, it may be stated that the phenol vaccine offers effective protection against typhoid fever, given the conditions under which it was used after the primary course of immunization, and that this protection is increased after the administration of a single booster dose. The protection afforded by the alcohol vaccine during the period of primary immunization was doubtful, but after a reinforcing dose the vaccine appeared to be as effective as the phenol vaccine. It should be noted, however, that the final analysis of the results may modify these conclusions.

The fact that the same results were obtained after a booster dose with vaccines showing different protective values after the primary immunization should occasion no surprise, since it is well known that repeated doses of an antigen can to a large extent make up for deficient antigenic quality. This may be an

explanation of the observation that the alcohol vaccine apparently protected adults to some extent during the first year, whereas it did not significantly protect children. In this area typhoid has been endemic for many years, and a considerable proportion of the adults can be assumed to have had previous experience of the antigen. It is possible, therefore, that the vaccine produced a booster effect rather than primary immunization, which would have been the case in many of the children vaccinated.

The extensive laboratory studies are not yet complete, but sufficient information is available to suggest, first, that the vaccines used in the trial were, in fact, representative of their type, and, secondly, that the relative potency of the vaccines as measured in the laboratory depends perhaps more on the test used and the way it is performed than on the vaccine itself. It is already clear that further research is needed to determine which laboratory test bears a relationship to the value of the vaccine when used in man. Plans are being made to promote this research.

This field trial may be taken as an example of the value of international co-operation. The initiative and support of the Yugoslav Government were, of course, indispensable; but, without the guidance and support of international experts and the provision of equipment both by the World Health Organization and by the United States Public Health Service, the Typhoid Commission would have found it difficult or even impossible to carry out the trial so effectively. Furthermore, international co-operation has made it possible not only to disseminate the findings of this experiment in the many countries which are faced with the same problem as confronted the Yugoslav Government, but also to plan future work on these problems in such a way as to ensure the comparability of overall results.

WATER POLLUTION IN EUROPE

Water pollution in Europe constitutes at the same time a series of national problems and an international one. A number of countries have a common interest in the great river systems of central Europe—the Rhine, the Rhone, the Danube, and some of their tributaries. The rivers of the British Isles, Iceland, Spain, Portugal, Greece, Turkey, and Scandinavia, however, do not belong to any great natural system, being separated from such systems by the sea or mountain ranges.

The rivers of Europe vary considerably with regard to size, characteristics of flow, climate of the lands traversed, human activities along their courses, and degree of pollution. There is also great variety in the laws and regulations governing pollution, in the organizations which exist for its control, in the public and official attitude to pollution, in the financing of the necessary works, and in the bodies responsible for purification operations. In some countries, pollution is a very serious problem, calling for rapid solution; in others, it constitutes a local problem only; and in still others, it is hardly regarded as a problem at all.

Countries in the first category sometimes find themselves confronted with a critical situation: while industrial development has increased water pollution to an entirely unforeseen extent, the higher standard of

living of large population groups has raised the demand for potable water and for domestic and industrial supplies. Thus, consumption of water increases as its quality deteriorates. The authorities of a number of countries are aware of this situation, and even alarmed by it.

A survey of the conditions in certain European countries was carried out under the auspices of WHO, which assists those concerned either in preparing legislation and regulations relating to water pollution or in revising existing provisions. In a forthcoming number of the *Bulletin of the World Health Organization* devoted to water sanitation, A. Key gives details of the results of this survey of 18 countries and discusses the conclusions to be drawn from it. The salient points are set out hereunder.

Pollution and economic development

Water is considered to be polluted when its composition or condition (temperature, for example) is altered, directly or indirectly, as a result of human activities so that it is unsuitable for the various purposes for which the community requires it (drinking supply, industry, etc.). Pollution is a consequence of industrialization and of the raising of living standards; it is the price which must be paid for improved domestic and urban hygiene, for greater material prosperity and mechanization. The problem is essentially one of industrial areas; it will become more and more urgent, and no permanent solution is as yet in sight.

Admissible degree of pollution

There is no agreement among countries concerning the degree of pollution which may be considered as acceptable ; opinions are widely divergent. Some maintain that the rivers and lakes must be restored to their pristine purity. There is at least one country in which this view is supported by common law—if not by practice—which stipulates that the owner of the banks of a stream has the right to receive the water of that stream in its natural state. At the other extreme are those who are as yet completely unconcerned about pollution. Between these two extremes are other, less sharply defined attitudes.

It is of course inevitable that civilization will change the state of rivers, as it changes forests and landscapes. Nevertheless, there is no reason why they should become barren and lose all their natural beauty. The disappearance of fish is generally a sign of excessive pollution; and in France, the United Kingdom, and Switzerland, there are laws governing the pollution of waters in which fish live. This attitude may be justified to some extent since there is no doubt that, from some points of view, fish are good indicators of the degree of water pollution. However, a price must be paid for progress, and it seems that certain fishing grounds will have to be sacrificed in exchange for improved living conditions. Too strict laws in this regard may be quickly devalued by usage.

How then are we to settle this question ? There must obviously be some compromise between what is desirable and what is possible, between the demands of users of water and the requirements of those whose factories pollute it. In Germany, for example, it has been agreed that the River Emscher cannot be maintained in a state suitable for fish or as a source of drinking-water, whereas the water of the Ruhr, in a neighbouring valley, has to be kept sufficiently pure so that, after appropriate treatment, it will be safe for drinking. Such variations in standards have been accepted in a number of countries. In Denmark there are " water courts " which decide how much purification of effluent is needed.

The problem is basically one of conflicting interests, and the different interests must

therefore be reconciled—the more so since they are not purely selfish interests, seeing that all are contributing to public welfare: it is in the general interest that towns be clean and healthy, that industry be in a position to produce consumer goods and to provide work for inhabitants who, in turn, should be able to bathe in clean water, to fish in streams in which fish can live, and to enjoy the beauties of nature. If these various legitimate interests are to be reconciled, there must be a compromise involving a certain amount of sacrifice and restriction ; and, in some countries, national legislation is necessary to impose such sacrifices and restrictions. It is this path that Germany, the Netherlands, Sweden, and Switzerland are following.

River authorities

Administrative decentralization whereby local authorities are made responsible for the regulations concerning pollution of watercourses has not given satisfactory results everywhere, and at the present time the tendency is to establish a central fluvial authority responsible for the whole of a river or group of rivers. In England, the Thames Conservancy Board—set up as long ago as 1857—has authority for protecting the whole River Thames and its tributaries, from which London's water supply is mainly drawn. The same principle was adopted in Germany at the beginning of the century, and the Netherlands has recently followed this example in one or two cases. Since 1948, nearly all the rivers of the United Kingdom have been administered largely on the Thames model. In the United States of America also, water pollution control commissions have been set up to cover whole river basins. It is probable that the trend towards regional control will increase in Europe.

Among the international rivers, the Rhine constitutes a serious problem, particularly in the Netherlands which, being poor in subterranean sources, must depend on the waters of a river which is polluted over its whole course by the waste waters of several countries and of many large industrial centres. In 1948 an international conference which met to discuss the River Rhine set up two committees—one to deal with fisheries, and the other with the protection of the Rhine from pollution by salt, organic matter, phenol, oil, sewage, and industrial effluent.

Effects of pollution

Scientific analysis—chemical, biological, and microscopic—is the only way of assessing the degree of pollution of a stream, of determining the measures which must be applied, and of checking the efficacy of such measures.

Polluted water becomes de-oxidized : if the rate of oxidization exceeds the rate at which oxygen is re-dissolved from the air, the water becomes devoid of oxygen. Normal freshwater organisms (including fish) do not then survive. Instead, anaerobic organisms flourish and produce gases such as methane, carbon dioxide, hydrogen sulfide, and other evil-smelling sulfur compounds; and the stream may then be fairly described as an open sewer. The oxygen impoverishment may be only partial, of course ; and, if it does not exceed a certain point, fish can live in the water. The oxygen content of water is believed to be the most important single criterion of pollution, and attempts have even been made to classify rivers on this basis. According to this test, a river is badly polluted if its dissolved oxygen does not reach 50% of its saturation value.

Dissolved oxygen is not, however, the only important factor : rivers which are up to standard from the point of view of oxygen content may be polluted by metallic salts or other toxic substances. The effect of such poisons may vary according to the concentra-

tion of oxygen in the water (toxicity increasing as the oxygen content is diminished), the temperature of the river, the pH, and the presence of other ions which may diminish toxicity by precipitating the toxic substances. Salts of heavy metals are very toxic : the lethal concentration of chromium, zinc, aluminium, gold, cadmium, lead, copper, mercury, and silver has been reported to be less than 1 p.p.m.; for mercury and silver the figure has been stated to be less than 0.01 p.p.m. Fortunately, contamination of European rivers by metal salts is confined to strictly limited areas. Such rivers are often also contaminated by sewage so that, by tacit agreement, they are considered as " industrial rivers ", and no effort is made to reduce their toxicity.

At the present time it seems impossible to calculate on the basis of its chemical analysis the effect of an effluent on fish. Empirical lists of tolerated rates of pollution by various toxic substances, such as are published in Belgium, are no doubt interesting ; but all the factors involved (oxygen content, temperature, nature of diluting water, etc.) must be determined and indicated in publications relating to this problem.

Many rivers are naturally of good bacteriological quality, but very few can be used for drinking water without treatment. Moreover, bacteriological pollution of water is dangerous for bathers. As a protective measure sewage discharges are sometimes chlorinated in the United States, although some experts are of the opinion that such chlorination may interfere with the natural biological processes and sometimes, through combination of the chlorine with certain substances in the effluent, produce compounds which are very highly toxic for fish. In the United Kingdom this method of purification is very little used for this reason.

Substances which, from the sanitary point of view, would not be described as polluting elements (phosphates, nitrates, humus, neutral salts, etc.) may alter the environment, with the consequent modification of the fauna and flora of a region. The work being done by investigators in many countries and the international conferences on this subject are evidence of the great interest which is now being taken in it.

Treatment of sewage and industrial effluents

Sewage is generally treated by different processes involving one or more stages. When simple sedimentation is insufficient, biological treatment is applied, by means either of percolating filters or of activated sludge. In many countries an effort is being made to increase efficiency of the aeration process in biological treatment in order to lower costs. Chemical treatment of sewage is applied only in special cases, on account of its high costs.

Industrial effluents may, by their composition, be unsuitable for admission to sewers: they may corrode or obstruct the conduits or affect the biological decomposition which takes place in them. Possibly the paper and associated industries are those which cause most pollution in Finland, Spain, and the Scandinavian countries. Other industries responsible for large quantities of polluting matter are sugar-beet factories, dairy product establishments, and gas and coke, textile, mining, and metallurgical industries.

The ideal way of dealing with industrial effluent is to recover the polluting material in some useful form. Fibre has been recovered from waste water from the paper and associated industries and has been put to further use. Some of the stronger wastes can be evaporated to dryness and the residue used as fuel. In the sugar-beet industry, diffusion water is now often re-used. Gas and coke-oven liquor can be extracted for the recovery of phenols. Copper can be recovered from its salts by reaction with iron filings. Treatment

of organic waste is generally biological; anaerobic digestion of very concentrated wastes makes it possible to recover valuable fermenting gases.

Standards for effluent quality

In some countries there are generally accepted standards for effluent quality, even though they may not be legal standards in the strict sense of the word. In the United Kingdom, for example, effluent must not contain more than 30 p.p.m. suspended solids or have a five-day BOD greater than 20 p.p.m. Other countries have adopted similar standards; but still others have no regulations on the subject. Belgium and Germany prefer to have standards for river quality. In Germany pollution is admissible if it does not exceed the population equivalent of 30 people for each litre per second of flow.

New problems

The nature of pollution and the problems it raises change with new developments in industrial processes and domestic habits. An example of the latter which is so far more or less confined to the United States is the use of the garbage-grinder. The sewers into which the resulting refuse particles are poured now contain a suspension of organic matter which was formerly left in the garbage can (or dustbin) and disposed of in its solid state; the concentration of mineral and organic substances in the sewers is thus increased. If this practice becomes general in Europe, cities which dispose of sewage without treatment will have to reconsider this practice. Another development of this type is the domestic use of synthetic detergents which are not decomposed by the biological treatment of sewage and may be toxic for man and for fish. Moreover, such detergents sometimes produce a foam which is not broken down in the water and instead remains in unsightly masses on the surface of the river over long distances. If these substances are neither oxidized nor absorbed into the stream, nor eliminated by percolation, they will get into water supplies. At the present time this question is being studied in the United Kingdom by a special committee composed of manufacturers, sanitary and water engineers, chemists, and medical men.

With regard to industrial effluents, they will no doubt continue to increase to an unforeseeable extent. New products which give off liquid effluent are continually being manufactured—antibiotics and insecticides, for instance.

The effects of the new polluting products used in agriculture have already been felt. Insecticides sprayed on crops and washed down by the rain may poison watercourses.

Conclusions

The rivers of the regions which were the first to be industrialized became polluted before there was any realization of the extent of the damage and the seriousness of the risks involved. Errors were committed through ignorance which could now be rectified only at enormous expense. Defective sewerage systems have been tolerated for years for lack of the financial means to improve them. These sad experiences should not be repeated; and, in areas which are in the midst of economic development, the risks of pollution should be met by taking steps now with an eye towards preventing it.

In almost every country where pollution presents serious problems, efforts are being made to deal with it. It will be interesting to see some years hence the results of the different measures being taken in different countries. Flexibility must be maintained in regulations concerning pollution: the problems change and evolve, and it would be regrettable if too strict provisions should impede rather than aid their solution.

From the technical point of view, the problem of treatment of domestic sewage is largely solved: the existing systems are satisfactory and are not too costly, and studies directed towards further improvements are in progress. The position with regard to industrial wastes is not yet quite so good. In addition to perfecting satisfactory treatment systems, it is necessary to investigate ways of altering the industrial processes themselves so that the amount of resulting pollution is diminished.

International action

In view of the diversity of practice, experience, and regulations in the various European countries, it would be inappropriate, and even undesirable from the technical point of view, to establish international standards applicable to all of them. Nevertheless, there is much to be said in favour of standards of quality based on *comparable* tests. For example, the empirical tests should be dispensed with, particularly the tests for oxidizable matter using potassium permanganate. Such tests vary according to the country using them (i.e., with respect to performance temperature, time, etc.), and the results are therefore not strictly comparable. It would be preferable to adopt a test designed to give an accurate figure for organic carbon. This type of test, which is simple to perform, would give more precise results; and variations in technique would be of less consequence. This is one example of an improvement that could be easily realized through international co-operation.

In the control of water pollution, which is a serious threat to all countries in the process of development, WHO, particularly through its Regional Office for Europe, offers valuable assistance by organizing seminars, publishing studies on relevant subjects, and serving as a clearing house for the exchange of scientific information. By these means it stimulates national action and encourages countries to follow each other's example in establishing standards which, though not necessarily identical, are equally stringent.

MALARIA ERADICATION

A Progress Report

A new technical policy in malaria-control activities was initiated in 1955 when the Eighth World Health Assembly called for action aiming at world-wide eradication of this disease.[1] The change in emphasis from control to eradication was prompted by scientific necessity ; it came with the realization that every effort must be made to utilize to the fullest the valuable weapon of residual-action insecticides before the vector species have time to develop resistance to these insecticides. The new strategy was supported by malariologists and public health administrators in the belief that eradication was not merely desirable, but actually attainable.

In the year that has passed since the Health Assembly's decision, significant advances towards the goal of malaria eradication have been made in many parts of the world. Changes in thinking regarding the ultimate aim have been translated into the formulation of long-term plans ; and, in a number of countries, intensification and expansion of

[1] Resolution WHA 8.30. *Off. Rec. Wld Hlth Org.*, 1955, 63, 31

MALARIA ERADICATION IN THE WORLD

Countries which have achieved eradication of malaria since 1946

Countries with malaria eradication programmes

Countries with malaria control programmes

antimalaria activities have already resulted. In the account which follows, an attempt is made to give an up-to-date review of the situation in some of the WHO Regions and of the Organization's recent work in this domain.

STATUS OF FIELD ACTIVITIES

Americas

In the Region of the Americas, where the idea of eradication was first accepted at the XIV Pan American Sanitary Conference in October 1954, antimalaria efforts have received great impetus in all the countries where the disease is still a problem. A Co-ordination Office for Malaria Eradication Programmes in the Region was set up in 1955, with headquarters in Mexico City. At the beginning of 1956 there were 23 WHO/PASB malaria workers assisting in Latin American compaigns, and this number is expected to increase considerably during the course of the year.

In Argentina, the Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, British Guiana, Haiti, Honduras, Mexico, St. Lucia, and Venezuela, eradication programmes are already under way. Arrangements have been made to start a similar programme in Brazil in 1957 ; and, in the same year, present control activities in Bolivia, Colombia, Costa Rica, Cuba, Dominica, Ecuador, British Honduras, Jamaica, Nicaragua, Panama, Peru, Surinam, Trinidad and Tobago may be converted into eradication campaigns.

No technical difficulties have been encountered thus far except in areas where the anopheline sub-genus *Kerteszia* is a vector. This species feeds out of doors and breeds in water collections among the leaves of certain neotropical plants with epiphytic habits known as Bromeliads. Malaria transmitted by this type of vector has been brought under control in Trinidad and in some sectors of Brazil, but it is necessary to find cheaper control methods than those employed up to the present time before large-scale efforts can be undertaken.

Eastern Mediterranean Region

Plans for malaria eradication have been completed and programmes begun in five of the countries east of the Mediterranean—Iran, Iraq, Jordan, Lebanon, and Syria—and it is hoped to make coverage of this sub-region more complete by the inclusion of Israel and West Pakistan.

In this group of countries technical difficulties are presented by (*a*) the need to use antilarval measures for the control of malaria transmitted by *Anopheles sergenti* and *A. claviger*, vectors peculiar to this region, and (*b*) the development of some resistance to DDT in *A. sacharovi* in some localities in Lebanon.

No new cases of malaria have been reported in Cyprus since 1950.

Europe

A WHO consultant has been sent to Turkey to assist in the development of a plan for malaria eradication which would bring Turkey within the circle of the Eastern Mediterranean countries mentioned above and help to fill one of the gaps in the " defences " of this area.

Greece and Yugoslavia already have well-advanced programmes of malaria eradication ; and, during a conference on malaria held in Belgrade in December 1955,[2] it was learned with satisfaction that three other Balkan Peninsula countries—Albania, Bulgaria, and Romania—have accepted the same objective. It has been reported that a five-year plan for malaria eradication is now under way in the USSR.

[2] See *Chron. Wld Hlth Org.*, 1956, **10**, 73.

In Greece, where the development of insecticide resistance in the vector species has caused much concern, the malaria morbidity in 1955 was, fortunately, no greater than in 1954. This may be attributable partly to the greatly reduced reservoir of infection in the country after seven years or more of extensive control, partly to the special steps taken to combat the danger, and partly to the fact that the meteorological conditions which prevailed in 1955 were to some extent unfavourable for the transmission of malaria. There is reason to believe that Greece may achieve eradication even though residual spraying with chlorinated hydrocarbon insecticides may have become largely ineffective.

In Yugoslavia there was a disturbing increase of malaria morbidity in Macedonia in 1955, but this was not thought to be due to any development of resistance to insecticides.

South-East Asia

In Ceylon and Thailand, malaria control has reached the stage where large areas are no longer sprayed but are subject to epidemiological surveillance. Following the visit of a WHO consultant to Afghanistan in 1955, that country is now willing and able to change the aim of its antimalaria programme from control to eradication. The Government of the Union of Burma has also agreed that, from 1956 onwards, antimalaria activities should have eradication as their goal ; and the Government of India, in a note addressed to WHO, has asserted the possibility " of aiming at total eradication by stages ".

There are no special technical difficulties impeding progress towards malaria eradication in the countries of South-East Asia except in Indonesia, where in some areas *A. sundaicus* has become resistant to insecticides and in other areas now avoids contact with the insecticides. It is hoped, however, that ways and means will be found to achieve " total eradication by stages " in Indonesia, as in India, before it is too late.

Western Pacific Region

Taiwan is well on the way to complete eradication of malaria. The same objective has been accepted by the Philippines for its long-term national programme. Both these countries are receiving substantial assistance from the United States International Co-operation Administration.

A need for inter-country co-ordination and co-operation which do not stop at regional boundaries is deeply felt by the countries of the Western Pacific Region in their antimalaria activities. The WHO Regional Office is attempting to meet this need through the organization of inter-country meetings of malaria workers and public health administrators. Two such meetings have been held in 1956, one in Cambodia, and the other in Sarawak.

There is every indication that the countries of the Western Pacific Region wish to work towards malaria eradication, and it seems likely that this aim may be achieved in most territories of the Region by means of residual spraying alone, although in some cases additional measures may be found necessary.

THE ROLE OF WHO

The World Health Organization has taken active steps to carry out the duties laid upon it by the Eighth World Health Assembly when it decided that the Organization " should take the initiative, provide technical advice, and encourage research and co-ordination of resources in the implementation of a programme having as its ultimate objective the world-wide eradication of malaria ".

First, WHO has attempted to obtain an accurate assessment of insecticide resistance

in some vector species by sending two entomologist consultants to Greece, Indonesia, Lebanon, and Saudi Arabia to make on-the-spot investigations. The existence of insecticide resistance in anophelines has been confirmed in all the places where it had been reported.

Three further cases of insecticide resistance in vector species have been reported since this investigation was made: one in *A. quadrimaculatus* in the Mississippi valley in the USA, another in *A. sundaicus* in Indonesia, and the third in *A. gambiae* in Northern Nigeria. WHO entomologists were instrumental in discovering the resistance in the last two cases.

Technical advice has been given, upon request, to governments by WHO expert personnel engaged in field projects and by regional malaria advisers. In addition, the Organization has provided short-term consultants to help a number of countries to plan antimalaria activities: Afghanistan, the Cameroons, Ethiopia, French West Africa, Indonesia, Iran, Iraq, Jordan, Lebanon, Somalia, Sudan, Syria, and Togo. Consultative visits were also paid to the Gold Coast, Kenya, Nigeria, Somaliland Protectorate, Southern Rhodesia, Tanganyika, and Zanzibar.

Action against malaria has been stimulated by various meetings and conferences which WHO has convened. Among such meetings have been a course on insect-borne diseases control, held in Rome in June 1955; the previously mentioned malaria conference in Belgrade and the two inter-country conferences in the Western Pacific Region; and the Second African Malaria Conference,[3] held in Lagos, Nigeria.

WHO is continuing to encourage and co-ordinate research on relevant problems, particularly on insecticide resistance in anophelines, methods of treatment for large populations, and the control of malaria transmitted by *A. gambiae*, the chief vector in tropical Africa.

For the last seven years, UNICEF has been giving substantial support to WHO-assisted and other antimalaria programmes, and early in 1956 it allocated a considerable sum to be spent on eradication activities in nine countries in the American Region and four in the Eastern Mediterranean.

Under the terms of the resolution adopted by the Eighth World Health Assembly, WHO has established a special account,[4] to consist of voluntary contributions from governmental and private sources and to be administered by the Organization, for furthering the purpose of world-wide eradication of malaria. So far, four contributions—offered by China, Brunei, Germany, and Iraq—have been accepted by the Committee on Malaria Eradication, to which such authority was delegated by the WHO Executive Board. The special account now has about $66 000 to its credit, which will enable the Organization to give emergency help, though in small measure, to countries requiring immediate financial, technical, and other assistance. However, present resources can meet only a small fraction of the total needs for international assistance in malaria eradication programmes.

In the long run, eradication will prove a financial saving. An eradication campaign lasting eight years—a period which includes five years of active surveillance—involves approximately the same expenditure per person as seven years of routine control. Those countries which are still applying control measures only should be urged to accept eradication as their objective, not only because of economic considerations, but also because the continued use of residual insecticides, year after year, may give rise to resistant vector strains.

---

[3] See *Chron. Wld Hlth Org.*, 1956, 10, 69.

[4] See *Chron. Wld Hlth Org.*, 1955, 9, 202.

Epidemiological and Statistical Information

CIRRHOSIS OF THE LIVER AND ALCOHOLISM

In the absence of any general international statistics on alcoholism morbidity, an approximate estimate of the incidence of alcoholism may be based on the statistics relating to deaths due to diseases of predominantly alcoholic origin. As the Alcoholism Sub-Committee of the WHO Expert Committee on Mental Health emphasized, during a discussion on alcoholism statistics, " under present conditions, the evolution of the mortality from ' alcoholism ' and from ' cirrhosis of the liver ' must be considered as the sole useful statistical element [even though] these figures represent only a minimum fraction of alcoholism in general (mortality and morbidity)." [1]

A recent WHO statistical publication [2] includes a number of tables showing mortality from cirrhosis of the liver and from alcoholism in certain countries. Several of these tables provide statistical series—either absolute figures by sex or the rates per 100 000 persons of each sex—which, in the case of certain countries, date back to the early years of this century. Others, covering the period 1950-54, give absolute and proportional figures for mortality, by sex, grouped under the following heads: cirrhosis of liver with mention of alcoholism, cirrhosis of liver without mention of alcoholism, alcoholism, and alcoholic psychosis.

To show exactly what kind of service the publication of such data can render, it might be desirable to demonstrate the advantages and shortcomings of using mortality statistics to determine alcoholism morbidity by comparing the results of this method with those obtained from other available indices and statistical procedures.

Value of alcoholism mortality statistics

When an attempt is made to assess the importance of alcoholism in a country, statistics on alcohol consumption are naturally the first source to be consulted. However, the Alcoholism Sub-Committee, in its second report,[3] pointed out that only very limited conclusions can be drawn from a comparison of *per capita* consumption rates. In some countries, for example, 37% of the alcohol is consumed by 2% of the population.[4] Unfortunately, all official statistics are based on " crude " rates; it would be impossible to obtain " real " rates (calculated on an estimate of the number of actual consumers) in the absence of data from periodic surveys, which have so far been lacking. Moreover, *per capita* consumption rates cannot be considered as " indicating a high or low degree of alcoholism or changes in the incidence of alcoholism. It would require *per capita* rates of extraordinary magnitude —as a matter of fact, of a magnitude which has never come within the range of observation—to permit of such inferences." [3]

Neither can the sampling method be used for the assessment of alcoholism, since, according to the WHO experts, the work and expenditure involved would be out of all proportion to the usefulness of the information which might be obtained. In some localities, of course, where practically all the alcoholics are known to the authorities, country incidence can be calculated by extrapolation. However, such cases are exceptions.

A working group entrusted by the Alcoholism Sub-Committee with the task of examining alcoholism statistics and surveys of

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1952, **48**, 14
[2] *Epidem. vital Statist. Rep.*, 1956, **9**, 172-242
[3] *Wld Hlth Org. techn. Rep. Ser.*, 1952, **48**, 18, 20
[4] *Wld Hlth Org. techn. Rep. Ser.*, 1954, **84**, 14

TABLE I. MORTALITY FROM ALCOHOLISM, BY SEX, IN 1921-25 AND 1951-54

Crude rates per 100 000 population of each sex

T = total, both sexes M = male F = female

Country	Yearly average						Quotient 1951-54 / 1921-25		
	1921-25			1951-54					
	T	M	F	T	M	F	T	M	F
Africa									
Union of South Africa (European population)	2.2	3.6	0.8	1.0 [a]	1.5 [a]	0.4 [a]	0.5	0.4	0.5
America									
Canada (excl. Yukon and N.W. Territories)	1.7	3.0	0.2	0.9	1.5	0.3	0.5	0.5	1.5
United States :									
All races	2.9	5.1	0.5	1.7 [a]	2.8 [a]	0.5 [a]	0.6	0 5	1.0
White	2.9	5.2	0.5	1.5 [a]	2.6 [a]	0.4 [a]	0.5	0.5	0.8
Non-white	2.9	4.6	1.1	3.0 [a]	4.7 [a]	1.4 [a]	1.0	1.0	1.3
Asia									
Japan	0.8	1.5	0.1	0.2 [b]	0.4 [b]	— [b]	0.3	0.3	—
Europe									
Austria	0.3 [c]	0.6 [c]	0.1 [c]	1.4	2.5	0.5	4.7	4.2	5.0
Belgium	2.3	3.6	0.9	0.9 [a]	1.6 [a]	0.3 [a]	0.4	0.4	0.3
Denmark	1.8	3.4	0.3	0.3 [a]	0.6 [a]	0.1 [a]	0.2	0.2	0.3
Finland	2.8 [d]	5.3 [d]	0.3 [d]	0.3	0.5	—	0.1	0.1	—
France	2.1 [e]	3.3 [e]	1.1 [e]	7.9	12.0	4.1	3.8	3.6	3.7
Germany (territory at the time)	0.6 [f]	1.2 [f]	0.1 [f]	0.2 [a]	0.5 [a]	0.1 [a]	0.3	0.4	1.0
Ireland	0.6 [g]	1.1 [g]	0.2 [g]	—	0.1	—	—	0.1	—
Italy	3.0 [h]	5.2 [h]	0.9 [h]	1.7 [a]	3.1 [a]	0.4 [a]	0.6	0.6	0.4
Netherlands	0.3	0.6	0.1	0.5	0.9	0.1	1.7	1.5	1.0
Norway	0.4	0.7	0.1	0.3	0.6	—	0.8	0.9	—
Portugal	4.0 [e]	7.0 [e]	1.2 [e]	2.9 [i]	4.8	1.0 [i]	0.7	0.7	0.8
Spain	1.8	2.9	0.7	0.9 [a]	1.4 [a]	0.4 [a]	0.5	0.5	0.6
Sweden	0.3	0.6	—	0.3 [j]	0.7 [j]	— [j]	1.0	1.2	—
Switzerland	10.3	17.8	3.4	5.0 [a]	9.1 [a]	1.1 [a]	0.5	0.5	0.3
United Kingdom : England and Wales	0.4	0.6	0.2	0.1	0.1	0.1	0.3	0.2	0.5
Scotland	1.5	2.2	0.7	0.3	0.6	0.1	0.2	0.3	0.1
Northern Ireland	0.7 [g]	1.2 [g]	0.1 [g]	0.1	0.2	—	0.1	0.2	—
Oceania									
Australia (excl. full-blood aboriginals)	2.7	4.4	0.9	2.4 [a]	3.9 [a]	0.9 [a]	0.9	0.9	1.0
New Zealand (excl. Maoris)	1.7	3.0	0.4	1.0	1.7	0.4	0.6	0.6	1.0

[a] 1951-53
[b] 1951-52
[c] 1938
[d] 1926-30
[e] 1931-35
[f] 1932-35
[g] 1922-25
[h] 1924-25
[i] 1951
1952-53

TABLE II. MORTALITY FROM CIRRHOSIS OF LIVER, BY SEX, IN 1921-25 AND 1951-54

Crude rates per 100 000 population of each sex

T = total, both sexes M = male F = female

Country	Yearly average						Quotient 1951-54 / 1921-25		
	1921-25			1951-54					
	T	M	F	T	M	F	T	M	F
Africa									
Union of South Africa (European population)	4.0	6.0	1.9	7.9 [a]	10.8 [a]	5.1 [a]	2.0	1.8	2.7
America									
Canada (excl. Yukon and N.W. Territories)	2.6	3.1	2.1	4.7	5.8	3.5	1.8	1.9	1.7
United States :									
All races	7.3	9.3	5.2	10.2	13.6	6.9	1.4	1.5	1.3
White	7.3	9.4	5.2	10.6	14.2	7.1	1.5	1.5	1.4
Non-white	6.8	8.5	5.1	7.1	8.8	5.4	1.0	1.0	1.1
Asia									
Japan	6.7	8.7	4.7	7.6	9.2	6.1	1.1	1.1	1.3
Europe									
Austria	10.2 [b]	13.8 [b]	6.8 [b]	12.0	18.1	6.7	1.2	1.3	1.0
Belgium	11.7	12.8	10.7	6.0 [c]	7.5 [c]	4.6 [c]	0.5	0.6	0.4
Denmark	1.7	2.5	0.9	6.1	5.8	6.5	3.6	2.3	7.2
Finland	1.5 [d]	1.7 [d]	1.3 [d]	2.6	3.1	2.2	1.7	1.8	1.7
France	12.9 [e]	16.4 [e]	9.6 [e]	24.6	31.4	18.3	1.9	1.9	1.9
Germany (territory at the time)	5.7 [f]	8.5 [f]	3.1 [f]	9.9	13.5	6.6	1.7	1.6	2.1
Ireland	3.1 [g]	4.5 [g]	1.6 [g]	1.9	2.5	1.3	0.6	0.6	0.8
Italy	12.4 [h]	18.5 [h]	6.4 [h]	13.2 [a]	19.0 [a]	7.7 [a]	1.1	1.0	1.2
Netherlands	3.7	4.4	3.0	3.1	3.5	2.7	0.8	0.8	0.9
Norway	1.7	2.3	1.0	3.2	3.6	2.9	1.9	1.6	2.9
Portugal	11.5	16.6	6.9	18.8 [i]	24.6 [i]	13.5 [i]	1.6	1.5	2.0
Spain	15.3	18.2	12.6	10.0 [a]	11.3 [a]	8.7 [a]	0.7	0.6	0.7
Sweden	2.0	2.6	1.5	3.2 [a]	3.5 [a]	2.9 [a]	1.6	1.3	1.9
Switzerland	7.5	11.5	3.8	11.9 [a]	19.0 [a]	5.2 [a]	1.6	1.7	1.4
United Kingdom : England and Wales	4.8	6.6	3.1	2.6	3.0	2.2	0.5	0.5	0.7
Scotland	3.3	4.4	2.3	3.4	4.0	2.8	1.0	0.9	1.2
Northern Ireland	2.1 [g]	3.1 [g]	1.2 [g]	2.3	2.4	2.2	1.1	0.8	1.8
Oceania									
Australia (excl. full-blood aboriginals)	5.4	7.1	3.6	4.6 [a]	6.1 [a]	3.1 [a]	0.9	0.9	0.9
New Zealand (excl. Maoris)	3.1	3.7	2.4	2.9	3.3	2.5	0.9	0.9	1.0

[a] 1951-53
[b] 1938
[c] 1952-53
[d] 1936-38
[e] 1926-30
[f] 1932-35
[g] 1922-25
[h] 1924-25
[i] 1952-54

alcoholism and of alcohol consumption advised national health administrations to study the formula established in 1940 by Dr E. M. Jellinek, of the Yale Institute for Alcohol Studies, which the group considered as the only method available of making comparative evaluations of alcoholism. Space does not permit of a detailed description of this method of evaluation, which, in any case, is to be found in two numbers of the *Technical Report Series*.[5] Suffice it to mention that in applying the formula each country must have certain data at its disposal, including the total number of deaths attributable to a disease such as cirrhosis of the liver and the percentage of cases in which alcoholism is the original cause. This percentage varies according to the alcoholic drink consumed and the type of drinker, and so far it has been accurately determined in only a few countries.

In the near future, therefore, it may be possible to use the statistics now available on mortality from " alcoholism " and " cirrhosis of the liver " to make an approximate estimate of the incidence of alcoholism in various countries, provided that the missing elements are computed and their faultiness taken into account. According to the Alcoholism Sub-Committee, " certification of death from acute and chronic alcoholism is notoriously unreliable, as physicians are generally reluctant to embarrass families through certification of the death of a family member from this cause ".[6] Moreover, it must be remembered that " in some cases a fall in the curve of deaths from acute and chronic alcoholism has reflected progress in the treatment of those conditions rather than a fall in the incidence of alcoholism... " [7]

It is necessary, then, to resist the temptation to consider these statistics as having an intrinsic value; they should in fact be regarded as instruments to establish the validity of certain points.

The following information is based on statistical data reproduced in the *Epidemiological and Vital Statistics Report*.

[5] *Wld Hlth Org. techn. Rep. Ser.*, 1951, **42**, 10, 21; 1952, **48**, 14, 26

[6] *Wld Hlth Org. techn. Rep. Ser.*, 1951, **42**, 21

[7] *Wld Hlth Org. techn. Rep. Ser., 1952*, **48**, 23

Deaths from alcoholism

Between the periods 1921-25 and 1951-54 most countries experienced a drop in the crude rates of mortality from " alcoholism " (Table I), which appears to have been at least partly due to advances in therapy, as has been previously noted.

Changes in certification may also account for some of the recorded decrease. According to the *International Statistical Classification of Diseases, Injuries, and Causes of Death*,[8] alcoholism mortality should include all deaths from diseases attributable to acute or chronic ethylism; however, alcoholic cirrhosis, alcoholic psychosis, and acute alcoholic poisoning are classified separately. The heading " alcoholism " therefore covers only part of the deaths due to acute or chronic alcoholism, without mental disorder.

It is obvious also that " alcoholism " is often not mentioned on death certificates in cases where acute or chronic alcoholism was the real cause of death even though the apparent cause may have been acute pulmonary disorder, cerebral haemorrhage, suicide, or a motor accident. It should be noted that, before the adoption of the 1948 revision of the International Lists of Diseases and Causes of Death, even when " alcoholism " was mentioned, the " underlying cause " was established on the basis of criteria which varied according to period and country.

The greatest caution should therefore be observed in inferring that the number of deaths actually due to alcoholism has decreased. In fact, the figures for mortality from cirrhosis of the liver seem to give little justification for optimism.

Deaths from cirrhosis of the liver

The data given in Table II are perhaps more reliable. They show that since 1921-25 the number of deaths from cirrhosis of the liver appears to have risen in the majority of countries. This apparent deterioration is attributable partly to the aging of the popula-

[8] World Health Organization (1950) *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death*, Geneva, Vol. I, p. 113, 166

tion and partly to improved diagnosis or greater accuracy in certifying causes of death. Nevertheless, investigations should be made to determine whether the disease has really become more prevalent in some countries and, if so, whether the increase is due to cases of alcoholic cirrhosis. It is to be hoped that a comparison of available data with the results of investigations made by national health administrations, or undertaken in WHO health demonstration areas, will clarify this point.

MORTALITY FROM SUICIDE

A study recently published by WHO [1] presents information on the mortality rate from suicide in certain countries, the rates by age and sex, and the trend of death rates from suicide by age and sex. It is believed that these mortality statistics are reasonably comparable. However, factors which cannot be measured, such as the proportion of deaths from suicide which have not been attributed to that cause—owing to failure to recognize it or reluctance to certify a death as suicide in view of the stigma attached to this act—should be kept in mind in interpreting the figures.

The crude mortality rates from suicide per 100 000 population, for both sexes and for males and females separately, for selected countries are given in Table I. The latest available data have been used in compiling this table.

The highest death rates from suicide in both sexes are seen in Japan, Denmark, Austria, and Switzerland, and the lowest rates in Ireland, Northern Ireland, Chile, Scotland, and Spain. The figures for Chile and Spain are not as recent as those for other countries ; but, when a comparison is made on the basis of statistics for 1951 or 1953, Chile and Spain remain among the countries with the lowest death rates from suicide. Within the USA the rate for the white population is almost three times that of the non-white population.

These crude death rates are influenced by the age composition of the population as well as by the actual incidence by age and

TABLE I. MORTALITY FROM SUICIDE FOR ALL AGES, PER 100 000 POPULATION, 1954

Country	Both sexes	Male	Female
Union of South Africa [1] (European population only)	11.9	19.4	4.4
Canada	7.3	10.9	3.5
Chile [3]	4.6	7.3	2.1
USA			
All races	10.1	16.1	4.3
White	10.8	17.2	4.6
Non-white	3.8	6.4	1.3
Ceylon	8.0	10.2	5.5
Japan	23.4	29.2	17.8
Austria	23.1	33.1	14.4
Belgium	13.8	20.5	7.3
Denmark	23.3	31.4	15.4
England and Wales	11.4	14.9	8.1
Finland	18.9	31.2	7.6
France	15.8	24.7	7.4
Germany (Federal Republic)	19.3	26.6	12.8
Ireland	2.0	3.2	0.8
Italy [1]	6.4	9.2	3.9
Luxembourg	10.4	15.1	5.8
Netherlands	6.2	8.2	4.3
Northern Ireland	3.5	5.3	1.7
Norway	7.4	12.2	2.7
Portugal [3]	10.2	15.4	5.3
Scotland	5.9	8.3	3.7
Spain [1]	5.9	9.1	2.9
Sweden [1]	18.6	28.2	9.0
Switzerland	22.6	33.9	12.0
Australia [1]	10.9	15.6	6.0
New Zealand (excluding Maoris)	8.9	13.4	4.4

[1] *Epidem. vital Statist. Rep.*, 1956, 9, 243

1953 1951

sex. Therefore, the age specific death rates for each sex, shown in the WHO study, are better suited for comparative purposes than the crude rates perforce presented here because of limitations of space.

Table I also shows that in all of the countries included therein the male rate for deaths from suicide is higher than the female rate. The ratio is roughly three to one, but it varies from more than four to one in Norway to less than two to one in Japan.

In males the highest death rate from suicide, in recent years, was found to occur generally in old age (70 years of age and over). In females the highest rates usually were seen in younger ages (the fifth and sixth decades), although in many countries rates were highest in the aged. It is interesting that in the USA the peak rates occur at a younger age in the non-white population than in the white population.

The WHO study also provides data on the trend of the death rate from suicide in certain countries, beginning with the opening of the twentieth century and covering the periods before and after each World War, the years around 1930 (which saw the great economic depression), and the present period. The rates are shown, for each sex, for three broad age groups encompassing adulthood and old age. Although there are some gaps in the data, it is clear that in most countries the highest mortality rate from suicide occurred in the period around 1930. It is interesting that in two of the three female age groups the peak mortality occurred in the period preceding the Second World War. It is also worthy of note that within each country the trends for the age and sex groups studied were not necessarily similar. For example, in Denmark the mortality rate from suicide in females aged 20-34 years was more than three times higher in the period 1947-49 than in the period 1920-22. On the other hand, the rate in males aged 55 years and over actually was lower in 1947-49 than in 1920-22.

The study does not attempt to relate these interesting differences among countries and variations within countries to the cultural, social, and economic factors believed to be related to suicide, but supplies the mortality data essential for those wishing to pursue such an inquiry.

International Co-operation in Nutrition

A recent number of the *Proceedings of the Nutrition Society* (Vol. 15, No. 1), published in Cambridge, England, is devoted in part to the nutritional work of FAO, WHO, and UNICEF, being an account of the 96th scientific meeting of the Society, which featured a symposium on this subject. It contains the following articles: " International co-operative activities in the field of nutrition; an introductory statement ", by P. Dorolle, Deputy Director-General of the World Health Organization; " FAO and nutrition ", by W. R. Aykroyd, Director, Nutrition Division, FAO; " WHO and nutrition ", by R. C. Burgess, Chief, Nutrition Section, WHO; " UNICEF assistance for child nutrition ", by the Secretariat of UNICEF; " Nutrition and home-economics programme in Egyptian villages ", by Mary A. Ross, FAO Home Economist, FAO Sindibis Project, Garden City, Cairo, Egypt; and " Nutrition work in Burma past and present ", by S. Postmus, Senior WHO Officer, Nutrition Project, Rangoon, Burma.

Reports of Expert Groups

FOOD HYGIENE

The importance of heating and drying foodstuffs to prevent spoilage and to preserve food values was recognized by man long before he understood the bactericidal and bacteriostatic action of these processes. With the passage of time, advances have been made and processes of preservation, such as sterilization, pasteurization, and freezing, have been developed. Nevertheless, the vast amount of ill health and human suffering resulting from the consumption of infected and contaminated food still remains a public health problem of world-wide importance. While it is manifestly impossible to establish uniform sanitation habits applicable to all countries, with their varied cultural patterns and customs, it is possible to establish certain general principles of food hygiene which could be adapted to national needs by public health authorities.

The task of formulating these general principles is undertaken in the fourth report [1] of the WHO Expert Committee on Environmental Sanitation. In addition, the problems of food hygiene peculiar to various areas of the world are reviewed, and guidance for the planning of food hygiene programmes in areas at different stages of development is given.

Principles in the control of disease-carrying foods

Many foods may be the vehicle of disease, and the report discusses in some detail the more important, i.e., milk and milk products; meat; fish, including shellfish; and vegetables and fruits commonly eaten raw.

Milk and milk products, owing to their importance in the diet of man and to their disease-conveying potentialities, should receive strict attention in all food hygiene programmes. Sterilization and pasteurization, while affording a measure of protection, must not be relied on alone : equally important aspects are the health of the live animal and the hygiene of production and subsequent handling. It is recognized in the report that in under-developed countries the general adoption of the processes of controlled heat-treatment of milk may present difficulties of an economic, administrative, and technical nature; but it is recommended that these processes should be carried out as soon as possible.

Meat that is freshly cooked is rarely implicated in outbreaks of food poisoning in highly developed countries, whereas the reverse appears to be the case in under-developed regions. Public health authorities, working in co-operation with veterinary officers, should ensure the closest supervision of all meat supplies, including inspection at point of slaughter and at all stages until delivery to the consumer. Abattoirs should be properly designed and constructed and provided with adequate facilities.

The feeding of pigs with uncooked garbage is, perhaps, the most important link in the chain of trichinosis infection and is a vulnerable point on which the sanitarian can concentrate his control efforts.

Statistics indicate that processed and made-up meat is responsible for the majority of food-poisoning outbreaks in certain highly

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1956, 104, 28 pages. Price: 1/9, $0.30, or Sw. fr. 1.—. Published in English, French, and Spanish.

developed countries, and that special precautions are therefore necessary in meat-processing plants. It is of interest to note that the method of canning hams by the pasteurizing process is considered to be undesirable; if permitted, the cans should bear clear instructions regarding their storage.

Poultry should be slaughtered at special centres, especially if, as the report recommends, evisceration is carried out soon after slaughter.

Antibiotics and hormone preparations are sometimes used in the feeding of poultry, with possible public-health implications, and the results of research in this field are awaited with interest.

Control of eggs should include all kinds of eggs offered for sale. Clean production methods, however, should not include the washing of eggs, as this removes a layer of protective albumin. Proper control should be exercised over the manufacture of powdered dried eggs, and an upper limit for total bacteria count per gramme should be established.

Fish should be inspected at the ports or at the inland distribution centres and markets, and control should extend throughout the line of distribution until it reaches the consumer. Shellfish-growing areas should be properly supervised, especially where the beds are subject to sewage pollution. Outbreaks of typhoid fever and other forms of salmonellosis have resulted from the consumption of contaminated shellfish. In some areas, fish is buried for a few days or allowed partially to decompose before salting—to suit local tastes as to colour, flavour, and texture—and consumption of such fish has resulted in salmonella and staphylococcal infections.

Vegetables and fruits that are offered to the consumer without having been washed or treated with an effective germicide present a special danger. Special measures of control are necessary where sprayed sewage, or sewage effluent, and toxic insecticides are used to improve the growth of vegetables and fruit. The use of weak chemical solutions, such as potassium permanganate, for disinfecting is ineffective and should be strongly discouraged. However, a solution of chloromelamine with wetting agent added and buffered to pH 3.8 has been found to be effective in destroying bacteria and cysts of *Entamoeba histolytica* on leafy vegetables.

In addition to these observations on, and recommendations for, the hygienic protection of foods particularly susceptible to contamination, the report also stresses the importance of laboratory control:

> Following inspection to enforce compliance with legal requirements, the collection and laboratory examination of specimens of products is most valuable. It is recommended that all unsatisfactory results reported by the laboratory be followed up immediately to ensure compliance with legal standards.

Problems in food-handling procedures

Most foodstuffs will eventually be processed or stored before reaching the consumer, and the report reveals some interesting but improper and dangerous procedures. For instance, in certain northern areas, the pasteurization of milk is discontinued during the colder seasons when spoilage is not a serious problem; elsewhere, lead shot is introduced into the gullets of poultry to increase the weight, which brings in the element of fraud and the hazard of lead poisoning; in other areas, canned hams are only partially preserved, in an effort to produce a certain flavour; moist foods, such as fish, are wrapped in newspaper, and contamination ensues from the coloured inks; and, in the tropics, it is customary to throw a handful of straw into the top of filled milk-cans to prevent splashing during transportation.

Contamination of food during serving presents the same problem of improper handling procedures, and, in view of the wide range of possible situations, it is necessary to establish food hygiene techniques which are adaptable to different conditions.

The principles of food hygiene in commercial and communal feeding are the same as in any other type of food handling, but they need to be applied with particular care

because of the special risks involved, as the report emphasizes:

> One careless food handler, or one human carrier of disease, preparing food at home will jeopardize the health of only a small number of persons, mainly members of the family. When one such person works in the kitchen of a restaurant, hospital, factory, canteen, school, or other place where meals are supplied to many people, the number of potential victims is correspondingly greater.

A special case of commercial feeding arises in air travel, which poses a number of unique problems. Instances have been reported of entire air crews having been taken ill with food poisoning simultaneously in flight, with serious implications for the safety of the passengers and aircraft.

Food hygiene programmes

In under-developed areas food hygiene programmes are usually faced with " problems of public inertia and apathy, with woeful sanitary conditions and practices, and with shortage of adequate means ". A start, however, must be urged; and the first step should be the development of a trained field staff, followed by the complementary services, such as laboratories and training institutes. The report emphasizes the " desirability of developing food hygiene programmes within the context of a developing general public-health programme ".

In rapidly developing areas the situation is usually encouraging—inertia has been overcome; poverty, ignorance, and disease are on the wane. Food hygiene programmes must keep pace with these changes: more advanced training should be given to field staff; health education of the public should be improved; research work should be developed; and higher standards should be set for food production and processing.

Many highly developed areas have now reached a point where the most needed elements of food hygiene are in full operation. The general objective in such an area is to maintain an effective, economical programme, and to bear in mind that " eternal vigilance is the price of safety ".

Suggested general fields of activity are given in the report as a guide in the establishment of new programmes or in the revision of existing programmes in food hygiene:

(1) Clean food-handling methods are a primary requisite, and the practice of workers performing individual food-handling operations should be studied.

(2) Field men should be on the alert for the improper use of chemicals in food establishments.

(3) The proper control of vermin and rodents is a necessary food hygiene activity.

(4) Only healthy animals should be used in the production of food.

(5) Reporting, investigating, and publicizing outbreaks of food poisoning or other food-borne diseases are means of creating official and public interest in food hygiene programmes.

Health education both of the public and of those engaged in the food industry should not be restricted to one-way methods, such as radio, television, lectures, films, and newspaper articles, but should be as wide as possible and include such activities as discussions, interviews, drama, and live demonstrations. Local participation in programmes of food hygiene can often be enlisted by the appointment of advisory committees.

Legislation should be flexible enough to keep pace with scientific and technical advances. For this reason it is suggested that " it is an advantage to have the basic legislation embodied in statutes and to set forth the more detailed and technical provisions in regulations made by those having the statutory power to do so ".

The report points out that very careful attention must be paid to the education and training of personnel, particularly the health inspectors on whom the bulk of the work in promoting food hygiene will fall. The duties of health inspectors include the inspection of foodstuffs, food sampling, the inspection of premises in which food is handled, the education of food handlers, and the investigation of outbreaks of food-borne disease.

RECENT ADVANCES IN THE DIAGNOSIS AND TREATMENT OF TRACHOMA

The reduction of the incidence of trachoma and the eventual elimination of this disease as a public health problem have long been sought, and it can be safely asserted that definite advances have taken place over the last few years, both in laboratory research and in control. These advances are reviewed and evaluated and guide-lines for further study are established in the second report of the WHO Expert Committee on Trachoma.[1]

Etiology

The cause of trachoma is generally believed to be an agent of the psittacosis-lymphogranuloma group of atypical viruses, at present designated as *Chlamydozoon trachomatis*. The report gives recognition to the importance of numerous claims for temporary cultivation of this agent but expresses the view that convincing evidence is lacking that cultivation in series or in quantity has been accomplished. Progress is noted in the recognition and definition of viruses causing other non-trachomatous follicular conjunctivitis sometimes confused with trachoma.

It is recommended that further investigations be undertaken to cultivate the virus of trachoma by some workable and generally applicable method, establishing without doubt that the virus being cultivated is the real cause of trachoma. The report proposes that virologists and ophthalmologists collaborate as closely as possible in this work and recommends the adoption of the following laboratory procedure : (1) demonstration of Halberstaedter-Prowazek (HP) inclusion bodies; (2) production, in monkeys and apes, of experimental trachoma capable of transmission in series; and (3) demonstration of serological relationship of the cultured virus to trachoma. While deploring the necessity for human inoculation, the report stresses that, for the time being, the final proof must rest on the production of typical trachoma in human volunteers.

Diagnosis

To clarify previously conflicting opinions among specialists in different countries on the diagnosis of trachoma, the report gives a definition of the disease and sets forth criteria of diagnosis, including differential diagnosis. An annex presents, in tabular form, the differential diagnosis of non-trachomatous follicular conjunctivitis.

Epidemiology

The report discusses in some detail the differences reported in various regions of the world in the epidemiological and clinical picture of trachoma and summarizes the principal variations as follows: age of onset, clinical evolution, frequency of spontaneous cures, frequency of disabling sequelae, and response to treatment.

The factors involved in determining the variations in incidence and type of trachoma found in a country are considered. These include the presence of associated bacterial conjunctivitis, which is important in determining differences in clinical evolution, particularly in the frequency and severity of disabling sequelae. It is noted in the report that in the present state of our knowledge it is impossible to say whether or not different strains of the causative agent exist which could be in part responsible for the differences observed in the chemical and epidemiological picture.

With regard to reported variations in response to treatment, these may have been due, in a certain percentage of cases, to the long period necessary for the disappearance of clinical symptoms after the completion of treatment. For this reason it is considered

[1] *Wld Hlth Org. techn. Rep. Ser.*, 1956, 106. 20 pages. Price: 1/9, $0.30, or Sw. fr. 1.—. Published in English, French, and Spanish.

that for a satisfactory assessment of cure a follow-up examination should be made not less than three months after the end of treatment.

Preliminary research on the local epidemiology of trachoma and associated infections is required for adequate planning of control measures. The report proposes that a standard method for epidemiological surveys be adopted and gives details of a proposed standardized plan for the collection of certain data in order to determine the trachoma index and the general pattern of disease in the community. It is recommended that these data be collected by probability sampling and that they be analysed according to recognized statistical methods.

Treatment

In the first report of the Expert Committee on Trachoma, which was published nearly four years ago,[2] a scheme of treatment based on the use of antibiotic ointment, combined with the administration of sulfa drugs when required, was recommended. The results of subsequent trials have not only confirmed the efficacy of this type of treatment for large groups of the population, under varying conditions and in different countries, but have also shown that the frequency of the daily applications of the antibiotic ointment can be reduced without appreciable loss of efficiency.

It is noted in the report that a considerable percentage of cures of trachoma has been obtained as a result of the short-term prophylactic treatment employed for the control of associated conjunctivitis, and that further trials of this method are fully justified. Recognition is also given to the satisfactory results of the use of antibiotics other than those originally recommended; further investigation of their action is desirable. Recent evidence suggests, too, that some repository drugs may also be effective against trachoma, and trials of such drugs are advocated. Attention is called to the possibilities of appearance of drug resistance.

The report continues with a discussion of the criteria of cure, admitting that there is as yet no sure method of determining whether the causative agent is destroyed or merely rendered inactive. Different criteria are specified, applicable to mass campaigns and to individual cases and immigration requirements.

Control projects

In advising on the planning of anti-trachoma projects, the report states that they must also include the reduction of any associated bacterial infections. It suggests that any project should be developed in four stages: (1) preliminary epidemiological survey, (2) pilot projects with varying techniques, (3) the mass campaign itself, and (4) integration of the project into normal public-health activities. Each of these stages is discussed in detail, and a number of directives are given.

The appraisal of results should, of course, follow the same general principles as those established for the evaluation of all public health projects. Nevertheless, a number of specific criteria are set forth which are applicable to a trachoma project.

Research

Problems for internationally co-ordinated research on trachoma are outlined, including virological, bacteriological, cytobacteriological, epidemiological, and therapeutic aspects. A request is made for further work and for co-ordination of results in each of these fields, as well as for exchange of information and of material for laboratory studies.

[2] *Wld Hlth Org. techn. Rep. Ser.*, 1952, 59, 4

THE TRAINING OF AUXILIARY HEALTH WORKERS

In countries where the expansion of health and medical services is an urgent requirement and where educational facilities are limited, a situation has arisen wherein partly trained health workers are being called upon more and more to perform certain tasks which are normally entrusted to fully qualified professional personnel. What this problem means in terms of selection and training is thoroughly investigated in a recent report of the WHO Expert Committee on the Professional and Technical Education of Medical and Auxiliary Personnel,[1] which is devoted to a discussion of the auxiliary health worker, his role in the general scheme of health services, and the training required to enable him to accomplish his task with efficiency.

Stress is laid throughout on the responsibility of health administrations to determine the needs of their particular countries, since it is on the basis of such an assessment that decisions as to personnel requirements must be made. Before examining the question of training, therefore, the report lists the basic health services of a community and classifies the professional personnel whom the auxiliary worker must assist or partially replace. No claim is made that the classification is complete, but on the basis of it a clear picture can be obtained of the type and level of the auxiliaries required. Also taken into account is the need for what is termed the "polyvalent health worker", who may be called upon to undertake a number of duties generally found in more than one professional field.

General training problems

Although, as the report points out, no universal formula can be advanced for the training of health auxiliaries, a few useful suggestions are given under the following headings: teaching personnel; place and kind of institution; selection of students; teaching methods; length of training; and curriculum content.

Undoubtedly, a prerequisite in the training of auxiliaries is the provision of fully qualified teachers and supervisors. For this reason, the report devotes some space to a description of the desirable attributes of such personnel, stressing that utmost importance attaches to their careful selection.

With regard to the location and type of training institution, it is emphasized that success depends to a large extent on the quality of teaching and on the availability of adequate equipment and facilities. Every effort should be made to ensure that the location of the training course reflects as nearly as possible the conditions prevailing in the area in which the students will subsequently work. In other words, a potential rural health worker should preferably be trained under rural conditions. Simplicity is advocated in the construction and design of training institutions, the basic needs of which are enumerated.

In discussing student selection, the report mentions that the choice of criteria must inevitably depend on local conditions. Such factors as character, ethical standards, age, and physical fitness as well as educational background play a vital role in selection. In the matter of educational qualifications, it is recommended that candidates who are suitably prepared should be encouraged to undertake professional studies.

Teaching methods and curriculum

Emphasis is placed on the practical aspect of training. In addition to demonstration methods and visual aids, "learning-by-doing" is strongly advocated as a means of bringing the student face to face with specific health problems. The report adds that

[1] *Wld Hth Org. techn. Rep. Ser.*, 1956, 109, 19 pages. Price: 1/9, $0.30, or Sw. fr. 1.—. Published in English, French, and Spanish.

a further step in the training process is " explaining-by-doing ". By this means the future health worker will be brought into contact with the people he will eventually serve, and will thus acquire their confidence and respect. Only the essentials of theory should be included in the curriculum, and the suggestion is put forward that teaching staff prepare sets of mimeographed notes, which can readily be brought up to date and serve as a practical reference book for the student.

Utilization of auxiliaries

Health auxiliaries should always work under the direct supervision of professional staff; they should not be allowed to practise independently. The ways and means of avoiding possible friction between auxiliaries and fully qualified professional personnel during the course of their joint work are next examined in the report. In the first place, the position of the auxiliary worker in the health organization must be clearly defined, and a reasonably high social status must be granted him. Any system of grading within an auxiliary category should be based on efficiency and experience and should avoid bringing the level of auxiliaries too close to that of fully trained professional workers.

Dealing with nomenclature, the report proposes that titles which are normally the prerogative of professional workers should not be given to auxiliary personnel in the same category, since this may lead to confusion in the minds of the population served. Rather, the term " assistant " should be employed (for example, midwifery assistant), or " aide " in the case of workers at a lower level.

The report stresses that, although supervision by the appropriate fully trained professional worker is always necessary, it should not be carried out in such a manner as to stifle the initiative of the auxiliary worker and reduce his sense of responsibility. As an extension of the idea that medical students should be given some sort of instruction on the role of their future assistants, it is suggested that professional health workers should learn how to make the best possible use of auxiliary staff.

International assistance

After a detailed account of assignment and conditions of service, the report continues with an offer of help from WHO in the training of auxiliaries. Governments are invited to draw on the store of information covering the results of experiments in various parts of the world, and to seek help either in setting up a new project or in modifying a programme already under way.

* * *

In conclusion, the report reiterates that the auxiliary health worker should be carefully chosen, adequately trained, suitably employed, fairly remunerated, and, above all, given the recognition to which he is entitled as an indispensable member of the team providing health and medical services.

German Translation of Monograph on Poliomyelitis

Poliomyelitis, a monograph published by WHO in 1955, has been translated into German, under the auspices of the Gesundheitskommission der Deutschen Gesellschaft für die Vereinten Nationen (Health Committee of the German Association for the United Nations), and has been published by Georg Thieme, Stuttgart.

Notes and News

Study Group on Paediatric Education

WHO is convening a study group on paediatric education in Stockholm from 30 July to 4 August 1956, immediately following a meeting of the International Paediatric Congress which is being held in Copenhagen.

The Organization has long recognized that adequate health services for children are largely dependent upon properly trained physicians, and that educational opportunities for training in paediatrics are sadly lacking in many areas. Even in highly developed countries paediatrics is a medical speciality of comparatively recent origin.

Three years ago WHO initiated a study of the present status of paediatric education in Australia and New Zealand, Europe, and Latin America, to obtain information comparable to that gathered in a similar investigation made some years previously in the USA by the American Academy of Pediatrics. The results of the WHO study are expected to form part of the basis of the study group's discussions and exchanges of view on current needs and developments in paediatric education in relation to health services for children.

Leading educators in paediatrics and public health specialists in maternal and child health from Africa, Central and South America, Asia, the Eastern Mediterranean Region, Europe, and the Western Pacific Region have been invited to participate in the study group. It is hoped that this meeting will stimulate developments in paediatric education and improvements in child health services in countries where these are needed.

Inter-Regional Malaria Conference

An inter-regional conference on malaria for the Eastern Mediterranean and European regions is being held in Athens from 11 to 19 June 1956. This conference has as its purpose the study of ways and means of facilitating malaria eradication in the two regions.

The participants are expected to make an up-to-date review of malaria and malaria-control achievements in Europe and the Eastern Mediterranean Region and to assess the present status of the development of resistance to insecticides in the anophelines which are of particular importance as vectors of the disease in this part of the world. They are to study the technical possibilities of eradication of malaria and the administrative arrangements that may be required, such as planning and organizing malaria services, appropriate legislation, training programmes, and standardization in reporting of results.

As eradication of malaria will bring as its consequence the interruption of residual insecticide spraying operations, the conference participants are expected also to discuss methods of establishing a system of epidemiological surveillance capable of detecting any case of malaria that might occur after the spraying operations are terminated, assuring prompt intervention, and thereby preventing the danger of epidemic outbreaks. Although it is generally felt that from a technical standpoint eradication of malaria in the countries surrounding the Mediterranean is feasible by the application of residual insecticides, consideration is to be given to special difficulties which may be encountered in certain areas. Among such difficulties would be the problems presented by malaria carried by mosquitos which are not very domestic, or movements of populations such as pilgrims or nomads. Finally, the conference participants are to devote attention to ways of co-ordinating operations in the various countries which are

carrying out eradication programmes in the two regions.

It is anticipated that the conference will be attended by about 60 participants from Europe and the Eastern Mediterranean Region and also by a number of experts from countries in other parts of the world where malaria eradication programmes or large-scale malaria-control programmes are under way.

Expert Committee on Malaria: Sixth Session

The WHO Expert Committee on Malaria will meet for its sixth session from 21 to 29 June 1956, in Athens, following the Inter-Regional Conference on Malaria for the Eastern Mediterranean and European regions. This meeting has been dictated by a need to provide the Organization with technical guidance on malaria eradication.

The Committee is expected to begin by defining the various terms employed when eradication is discussed, planned, or implemented. It will consider the techniques that must be followed in epidemiological inquiries and in the evaluation of results, since the methods now applicable to control campaigns are not sufficiently reliable for eradication programmes. It will also deal with the technical problems involved in achieving eradication in the shortest possible time and with the greatest safeguards against the reintroduction of malaria.

The membership of the Committee will be: Colonel M. K. Afridi (Pakistan), Dr L. J. Bruce-Chwatt (United Kingdom, working in Nigeria), Dr A. Gabaldón (Venezuela), Dr L. F. Gunaratne (Ceylon), Dr K. C. Liang (China), Professor G. Livadas, (Greece), Professor G. Macdonald (United Kingdom), Professor G. Raffaele (Italy), and Colonel J. Singh (India).

Expert Committee on Insecticides: Seventh Session

The resistance of insects to insecticides is a problem which has developed to the point where many of the large-scale programmes for the control of vector-borne diseases in man may soon fall into jeopardy. During the past few years, reports have been received from a number of countries to the effect that certain anophelines have shown varying degrees of resistance to DDT, and that several species of culicine have followed the same pattern. It is known that body-lice in Korea can no longer be controlled by DDT and that signs of resistance in these insects have also been observed in other countries. A resistant strain of *Aëdes aegypti* has been found in Trinidad; and housefly control with certain chemicals is no longer possible in almost all areas where these materials have been used for any appreciable length of time. Evidence has now been gathered that the amount of research that is being performed to ascertain what causes death when insects are exposed to insecticides and what are the biochemical and physiological bases of resistance is inadequate when compared with the magnitude of programmes for the control of vector-borne diseases by insecticides.

The seventh session of the WHO Expert Committee on Insecticides, which is to take place from 10 to 17 July in Geneva, will be devoted to consideration of the present status and possible consequences of insect resistance to insecticides. The Committee will be asked to report on the biological aspects of resistance, including biochemical, physiological, genetical, and ecological factors. It is hoped that recommendations will be forthcoming on possible substitute means of insect control, including, perhaps, the use of biological and naturalistic methods. The chief topic which the Committee is expected to discuss is an international collaborative scheme of research on problems associated with the control of insect vectors of disease. In preparation for this discussion the Organization has arranged for visits by staff members and consultants to almost every laboratory of importance where research on insect resistance to insecticides is being performed. On the basis of the information gathered it is hoped to develop a collaborative plan of concentrated research on some of the

fundamental problems connected with insect resistance to insecticides.

Expert Committee on Organization of Medical Care

WHO is convening, for the first time, an Expert Committee on Organization of Medical Care. The meeting will take place in Geneva from 18 to 23 June 1956.

The question of organization of medical care is one in which WHO interest has been manifest for some time. At the Fourth and Fifth World Health Assemblies resolutions were adopted with a view to initiating studies on this subject. An Expert Advisory Panel on Organization of Medical Care was established in 1954.

The meeting to be held this month will have as its central theme the role of hospitals in programmes of community health protection. There is now agreement among public health and hospital administrators that the hospital should play an important part in any programme intended to give comprehensive health protection to a community. For example, the International Hospital Federation, a non-governmental organization which is in official relations with WHO, devoted its 8th Congress to the subject " Preventive medicine as a major function of the hospital ", showing the trend of modern hospital administration towards the fulfilment by the hospital of preventive functions with a view to giving better health protection to the community. Nevertheless, except for some few local experiments, there is as yet no place where the hospital is actually playing its full part in medical care services. Even in countries where hospitals are administered by the State, it is usual to find two different branches within the ministry or directorate of health, one dealing with health, and the other with medical services. Unfortunately, co-ordination between the two divisions is not always good.

How can the desired co-ordination best be achieved ? This is one of the fundamental questions which the Expert Committee will attempt to answer. Joint housing of hospitals and public health services, inter-changeability of personnel, and community support of hospital activities are among the methods which have been recommended and which are expected to be analysed by the Committee. The important role of the out-patient department, the convenience of organizing home medical care services, the regionalization of the hospital system, and the responsibilities of physicians, nurses, and social workers are other items for discussion.

Experts in hospital administration, public health administration, and public health nursing have been selected to exchange points of view and advise WHO as to the best approach to a problem that is of utmost importance in many Member States, especially those in which a national health service has been recently established or is under study. The following are expected to participate in the meeting: Dr. T. C. Routley (Canada), Dr S. del Rio Gundian (Chile), Miss E. Magnussen (Denmark), Dr R. F. Bridgman (France), Dr B. C. das Gupta (India), Dr K. J. Mann (Israel), Dr A. Engel (Sweden), Dr H. M. C. Macaulay (United Kingdom), and Dr E. M. Bluestone (USA).

European Conference on Post-Basic Nursing Education

As one of its inter-country programmes for 1956, the WHO Regional Office for Europe has organized a conference on post-basic courses for nurses, to be held at Peebles, near Edinburgh, from 12 to 26 June 1956.

Previous nursing conferences have repeatedly stressed the importance of teaching methods and curricula in giving nurses the best possible training. The aim of the Peebles conference is to examine when and how post-basic courses should be introduced.

A detailed agenda has been drawn up on the basis of proposals made by the participants themselves. These proposals show that the main problems absorbing nurses in Europe are remarkably similar. Reports prepared beforehand describe achievements in post-basic nursing education in the various countries which will be represented at the conference.

More than forty nurses from nineteen countries [1] have been invited to attend the conference, which, in addition, will have the collaboration of a number of experts in teaching, psychology, sociology, and public health administration.

Miss N. D. Fidler, Director of the School of Nurses, University of Toronto, and Miss Y. Hentsch, Director of the Nursing Section, League of Red Cross Societies, are advising the WHO Secretariat on the preparation of the conference. Dame Elizabeth Cockayne, Chief Nursing Officer, Ministry of Health, London, and Miss M. O. Robinson, Chief Nursing Officer, Department of Health for Scotland, Edinburgh, will act as joint presidents.

The following have been appointed as lecturers: Professor J. H. F. Brotherston, School of Social Medicine and Public Health, Usher Institute, Edinburgh; Dr Magda Kelber, Director, Haus Schwalbach, Lindschied über Bad Schwalbach, Hesse; Professor G. Mialaret, Lecturer in Psychology, Faculté des Lettres, Université de Paris, and Lady Gertrude Williams, Head of the Sociology Department, Bedford College, University of London. Miss Ellen Broe and Miss Yvonne Schroeder, of the Florence Nightingale International Foundation, will describe the preliminary results of a study undertaken by the Foundation on post-basic nursing education.

Study Group on Toxic Hazards of Pesticides to Man

A study group on the toxic hazards of pesticides to man is meeting, in Geneva from 6 to 13 June 1956, to continue work which WHO began in response to a resolution of the Fourth World Health Assembly requesting that a study be made, in collaboration with ILO and FAO, of such hazards.[2] Dr J. M. Barnes was engaged as a consultant to undertake the necessary investigation, and the results of his inquiry were published in a monograph entitled *Toxic hazards of certain pesticides to man*.[3]

The study group which is now being convened will review the problem and recommend the action that WHO, FAO, and ILO might take in future to keep Member States aware of the dangers and implications of the use of pesticides in agriculture and public health. Its discussions will cover: (*a*) methods in which pesticides are used in public health and agriculture, (*b*) the protection of operators handling pesticides, (*c*) the extent of poisoning by pesticides and the methods by which more information might be gathered about their effect on operators who have suffered long exposure to them, (*d*) the possibility of classifying pesticides on the basis of their toxicity and the extent to which gross contamination of food and water might occur, and what hazards might be created thereby, and (*e*) the hazards to which third parties are exposed, including the control of pesticide levels in food and the analytical problems involved in controlling pesticide contamination of food. The study group is expected to consider those situations in which a real risk of acute, sub-acute, or chronic poisoning by pesticides might occur, and to recommend ways in which more factual evidence of intoxication might be obtained, focusing attention on those groups of people in which exposure to insecticides is greatest.

The importance of proper protection of persons handling insecticides is now enhanced by the increasing resistance of insects to insecticides and the consequent use of materials of greater toxicity than DDT and BHC, the insecticides most commonly employed up to the present. Protective measures must be based, however, on scientific evidence of their worth and practicability in the field.

The following are expected to attend this study group meeting: Dr J. M. Barnes, Toxicology Research Unit, Serum Research

[1] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, Yugoslavia.

[2] Resolution WHA 4.31. *Off. Rec. Wld Hlth Org.*, 1952, 35, 29

[3] Barnes, J. M. (1953) *Toxic hazards of certain pesticides to man*, Geneva (*World Health Organization Monograph Series*, No. 16)

Institute, Carshalton, England; Dr L. F. Gunaratne, Superintendent, Antimalaria Campaigns, Colombo, Ceylon; Dr W. J. Hayes, jr, Chief, Toxicology Section, Communicable Disease Center, Savannah, Ga., USA; Dr P. Kästli, Director, Etablissement fédéral d'industrie laitière et de bactériologie, Liebefeld-Bern, Switzerland; Dr Kingsley Kay, Chairman, National Health Pesticide Committee, Department of National Health and Welfare, Canada; Dr S. Seshigiri Rau, Director of Public Health, Bangalore, India; Dr S. W. Simmons, Chief, Technology Branch, Communicable Disease Center, Atlanta, Ga., USA; Dr Ake Swensson, Director, Karolinska Sjukhuset, Stockholm, Sweden; and Professor R. Truhaut, Faculté de Pharmacie, Université de Paris, France.

Advisory Group on Accident Prevention

At a time when infant and child mortality in many countries is steadily decreasing and in many places has reached astonishingly low figures, the rate of deaths due to accidents remains high and assumes a proportionately greater importance. In fact, in some countries accidents have become the chief cause of death in the age group 1-19 years ; and in some places more pre-school children are killed by accidents than by all other causes combined. The scope of the accident problem is further indicated by estimates according to which the non-fatal accidents, which may include permanent disablement, are one hundred or two hundred times more numerous than the fatal ones. For these reasons important anti-accident activities have been undertaken in some countries and planned in others where the problem is coming more and more into the foreground.

In order to develop sound and effective accident-prevention programmes, there is need for comparative information on the prevalence of accidents and for sharing knowledge and experience gained in prevention programmes. It is for this reason that the WHO Regional Office for Europe is convening an advisory group on the prevention of accidents in childhood, which is meeting in Geneva from 4 to 8 June 1956. This meeting is the result of interest in accident prevention which has been expressed by several Member Governments, and it is the first inter-country activity of its kind in this field.

The theme of the meeting is " Accident facts as a basis for preventive measures " ; and the advisory group is to study, in particular, methods of obtaining and presenting facts which may form the background for preventive action. Concentrating on the epidemiology of accidents, the group will review various methods of fact-finding with regard to both fatal and non-fatal accidents. It will examine how studies might profitably be designed to yield information adequate for preventive work and its subsequent evaluation and to give figures and results which would be internationally comparable. The group is also expected to make recommendations to WHO on further action in this field.

In the preparation of the meeting the Regional Office has been assisted by two consultants, Dr George M. Wheatley, Chairman of the Accident Prevention Committee of the American Academy of Pediatrics, New York, and Dr R. Berfenstam, Associate Professor of Paediatrics at the University of Uppsala, Sweden. Nine representatives of specialities such as public health administration, medical statistics, accident surgery, and others, from different European countries, have been invited to participate in the meeting.

Seminar on Vital and Health Statistics

In April 1956, WHO and the Government of Viet Nam sponsored, in Saigon, a seminar for personnel engaged in health and demographic statistics work (either in medical institutions and health departments or in civil registries) in Viet Nam, Laos, and Cambodia. Nineteen persons participated in this seminar.

The training was practical in nature and comprised instruction in basic statistical methodology, familiarization with the usual procedures employed in vital and health

statistics services, instruction in dealing with national and international data, exchange of information on the participants' national systems, acquainting the trainees with international recommendations relative to statistical systems, and discussion of the comparability of date, with emphasis on the three participating countries.

Dr M. Pascua, WHO Director-Consultant on Health Statistics, acted as adviser for the seminar and took part in the training activities. The Organization also provided other teaching personnel, seven fellowships for participants, and teaching equipment. The Government of Viet Nam supplied three members of the teaching staff, among them Mr Ngo Ngoc Doi, Director of the Institute of Statistics and Economic Studies of Viet Nam, who directed the seminar. The United Nations also lent its aid through provision of one lecturer and certain teaching materials.

The seminar included practical exercises and field visits as well as formal instruction, which was in French. Interest in the seminar was keen, and it is hoped that the training given has paved the way for improvement of the statistical services of the countries concerned.

Study Group on Water Standards

A WHO-convened inter-regional study group on water standards met in the Philippines from 15 to 27 April 1956 to discuss problems of water quality in the Western Pacific and South-East Asia regions and to formulate definite standards of quality for treated and untreated water as recommendations to be considered by an international study group meeting in Geneva in June 1956. The group was composed of experts from Australia, China, India, Indonesia, Japan, New Zealand, the Philippines, Singapore, and Thailand. Professor F. W. Gilcreas, former Assistant Director of the Division of Public Laboratories and Research, State of New York, now Professor of Sanitary Science at the University of Florida, acted as expert consultant for the study group.

The working sessions of the group were complemented by field trips to various water installations in Manila and its suburbs. Two open forums were held, one being concerned with the recommended standards of water quality, and the other dealing primarily with laboratory techniques for the examination of water. The group concluded that much research on water quality and standard methods for water examination is needed, and it listed some 25 important projects which should be considered for co-operative study.

Seminar on Teaching of Preventive Medicine

As part of WHO's world-wide programme in strengthening the teaching of preventive medicine in medical schools, a second Latin American seminar on the teaching of preventive medicine was held under the auspices of the Pan American Sanitary Bureau, which acts as WHO Regional Office for the Americas, from 23 to 28 April 1956, in Tehuacán, State of Puebla, Mexico. The participants included deans and teachers from 39 medical schools in Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Puerto Rico, and Surinam.

Like a previous seminar for countries of the southern part of Latin America, held in Chile in October 1955,[4] this one had as its purpose to stimulate the teaching of preventive medicine throughout the medical curriculum. Among the topics discussed were methods of teaching preventive medicine, the organization of a department of preventive medicine and its relation to other departments of the school of medicine, and the role of the medical school in community health services.

Conferences on the same topics have also been held in Europe (in Nancy, France, and Göteborg, Sweden), and in various countries of the South-East Asia and Eastern Mediterranean regions, on the occasion of the presence of visiting teams of medical scientists sent by WHO to those countries.

[4] *Chron. Wld Hlth Org.*, 1956, 10, 24

Malaria Consultant for Eastern Mediterranean Countries

Professor G. Livadas, one of the first malariologists to report on the resistance of vector anophelines to residual insecticides, is visiting Jordan, Lebanon, and Syria, as a WHO consultant on problems of malaria eradication. Dr Livadas, who is on leave from his post as Professor of Malariology at the School of Public Health in Athens, has fulfilled other assignments for WHO : he was Regional Adviser on Malaria in South-East Asia for two years ; and in 1955 he served for four months as a consultant in the organization of a malaria campaign in Afghanistan.

BCG Vaccination in Jordan

A two-year BCG vaccination campaign, conducted under the technical direction of WHO, recently came to an end in Jordan. This campaign, which was also aided by UNICEF and the United States International Cooperation Administration, was considered highly successful. More than 600 000 children under fourteen years of age were tuberculin tested and more than 300 000 vaccinated.

Dr Jibran M. Farah, WHO technical adviser, has reported that, as a result of the campaign, a special BCG section has been set up in the Ministry of Health of Jordan to take care of vaccination needs in the future. This service is to be incorporated into a national antituberculosis programme in which 72 persons trained by international staff during the past two years are expected to work.

Contribution to Special Malaria Eradication Account

The fourth contribution to the voluntary fund for malaria eradication has been announced: $4200 from the Government of Iraq. Other contributors to this special account have been Brunei, China, and the Federal Republic of Germany.

New Appointments

The posts of Chief, Maternal and Child Health Section, and Chief, Mental Health Section, which had been vacant for some time at WHO Headquarters, have recently been filled. The first is occupied by Dr Jessie Bierman who, before joining the Organization, was professor of maternal and child health at the University of California School of Public Health. Between 1942 and 1947 she was Chief of the Bureau of Maternal and Child Health, California State Department of Public Health in San Francisco, and from 1936 to 1942 was Assistant Director of Health Services, US Children's Bureau. Dr Bierman is a graduate of the University of Montana, the University of Chicago, and Columbia University.

Dr E. Eduardo Krapf, who is now Chief of the Mental Health Section of WHO, was previously associate professor of psychiatry at the University of Buenos Aires. He was also connected with the National Hospital of Neuropsychiatry and acted as Psychiatric Consultant to the Armed Forces of Argentina. Last year Dr Krapf was elected Vice-President of the World Federation for Mental Health, having been an active member of that body for some time past. He holds the titles of Professor Extraordinary at the University of Cologne and Honorary Professor of the St Thomas University, Manila. Dr Krapf received his medical training at the Universities of Munich and Buenos Aires.

Another new appointment is that of Dr Carl S. Sebelius, who will take up his duties as Dental Health Officer in June. Dr Sebelius was formerly Director of the Division of Dental Health of the Tennessee Department of Public Health. He studied at Northwestern University, Chicago, at the Vanderbilt University School of Medicine, Nashville, Tenn., and at the University of Michigan School of Public Health.

Review of WHO Publications

Composting : Sanitary Disposal and Reclamation of Organic Wastes. By Harold B. Gotaas. Geneva, 1956. (*World Health Organization : Monograph Series*, No. 31) 205 pages, 49 figures. Price: £1 5*s.*, $5.00, or Sw. fr. 15.— (clothbound).

" Throughout most of the period of the recorded history of man some association between disease and man's waste products has been thought to exist. Since man began to plant in order to harvest needed foods, he has also associated these waste products with the fertility of the soil and the harvest." These opening words of Dr Gotaas's book show that the sanitary and agricultural importance of organic wastes is no new discovery; yet, as the author goes on to say, " it is only a little more than a century since basic knowledge and a true understanding of the processes involved began to be acquired ".

After describing briefly the processes involved in the decomposition of organic matter and summarizing the public health and economic aspects of composting, the author reviews the historical development of composting methods, from the earliest simple techniques up to the most modern mechanized processes. A short chapter on the analysis of various types of wastes comes next, followed in its turn by a long and detailed discussion of the many factors affecting the production of good compost. The author then proceeds to describe the methods of composting recommended for large towns, for villages, and for individual farms, illustrating his descriptions liberally with diagrams and photographs. The book ends with an interesting chapter on the recovery of methane from the digestion of manure and night-soil.

While much has been written about the fertilizing value of organic wastes, few publications have at the same time dealt thoroughly with the question of the danger to public health inherent in the disposal of wastes on to the land. This book, which emphasizes the principles underlying the safe disposal of community wastes and relates them to the factors governing the recovery of nutrients from the soil, meets a very real need.

Bulletin of the World Health Organization, 1956, Volume 14, Number 3 (pages 353-592).

This number of the *Bulletin* contains the following: " Synthetic substances with morphine-like effect: relationship between analgesic action and addiction liability, with a discussion of the chemical structure of addiction-producing substances ", by N. B. Eddy, H. Halbach & O. J. Braenden; " Bilharziasis survey in south-western Asia, covering Iraq, Israel, Jordan, Lebanon, Saudi Arabia, and Syria: 1950-51 ", by M. Abdel Azim & Anne Gismann; " Recommended laboratory methods for the diagnosis of plague ", by M. Baltazard and others; " The Arizona group of Enterobacteriaceae in animals and man: occurrence and distribution ", by P. R. Edwards, Alma C. McWhorter & Mary A. Fife; " Effect of preservation on the viability and allergenic potency of dried BCG vaccine ", by Yoji Obayashi and others; " The Second International Standard for Corticotrophin ", by M. V. Mussett & W. L. M. Perry; " The alpha antitoxin content of the International Reference Preparations of *Clostridium welchii* Types B and D Antitoxins ", by A. Skulberg & W. E. van Heyningen; " Use of synthetic, crystalline, L-α-dimyristoyl lecithin in cardiolipin antigens ", by Alice Reyn & M. W. Bentzon; " Etude des propriétés sérologiques de la lécithine L-α-dimyristique synthétique cristallisée ", by Marguerite Faure & C. de la Vaissière; and a bibliographical section on typhus and related infections.